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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,891	11/13/2001	Dipankar Chandra	004578.1148	2882

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Jerry W. Mills  
Baker Botts L.L.P.  
Suite 600  
2001 Ross Avenue  
Dallas, TX 75201-2980

EXAMINER

SINES, BRIAN J

ART UNIT	PAPER NUMBER
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1743

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/006,891	<b>Applicant(s)</b> CHANDRA ET AL.	
	<b>Examiner</b> Brian J. Sines	<b>Art Unit</b> 1743	

-- The **MAILING DATE** of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 27-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,3</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of group I, claims 1 – 12 and 27 – 36 in the response submitted 10/28/2003 is acknowledged.

Claims 13 – 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 12 and 27 – 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In a claim drawn to an apparatus statutory class of invention, a functional limitation may not be divorced from any specific structure or specific composition. A functional limitation is an attempt to define an apparatus by what it does, rather than by what it is, *as evidenced by its specific structure* (emphasis added) (see MPEP § 2173.05(g)). Therefore, it is unclear as to what precise structural limitation(s) of the claimed invention impart the functional ability of the apparatus to have a sensing layer configuration that creates an interfacial tension at the interface of the sensing layer and the piezoresistive layer, but such that the reaction of the target matter or analyte with the sensing layer does not affect the bulk properties of the sensing layer enough to change the electrical resistance of the piezoresistive layer. Does the sensing layer have specific dimensions or a specific composition, which imparts this functional ability? Similarly, does the

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piezoresistive material layer have specific dimensions or a specific composition, which imparts this functional ability? The structure must be organized and correlated in such a manner as to present a complete operative device. Furthermore, a feature, which is taught as critical in the specification, should be recited in the claims (see MPEP § 2164.08(c)).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowell, Jr. *et al.* (U.S. Pat. No. 5,028,394). Regarding claim 1, Lowell, Jr. *et al.* teach a sensor apparatus comprising: a chemically-sensitive layer (*i.e.*, functional groups, such as carboxylate groups covalently attached to the mechanicochemically responsive polymeric film backbone 2); a piezoresistive material (polymeric film 2) coupled to the chemically-sensitive layer; and an electrical circuit coupled to the piezoresistive material (see col. 3, line 6 – col. 5, line 56; figures 1a – 4). Regarding claims 1 – 3, Lowell, Jr. *et al.* anticipate that the electrical circuit is operable to detect the rate of change in the electrical resistance of the piezoresistive material to determine the type and concentration of target matter (see col. 4, lines 59 – 68; col. 5, lines 1 – 56). Regarding claims 4 – 6, Lowell, Jr. *et al.* teach the use of interfacial polymerization in fabricating the sensor (see col. 4, lines 15 – 50). Lowell, Jr. *et al.* teach that the sensing element portion 10a or polymer material should be fairly thin, on the order of 1 – 10 mm thick, in order to minimize the time required for diffusion of the analyte into the bulk of the sensing element and

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to maximize its flexibility and thus its ability to efficiently transfer expansion or contraction to the transducer 10b. The sensing element should be integral with the transducer element, through fusing, adhesion or bonding with an adhesive between the sensing element and the transducer (see col. 4, lines 15 – 27). Therefore, the chemical sensitive film of the prior art appears to be structurally identical, except that the prior art is silent as to an inherent characteristic, such as those characteristics recited in claims 4 – 6. Regarding product and apparatus claims, when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (see MPEP § 2112.01). The Courts have held that the claiming of a new use, new function or unknown property, which is inherently present in the prior art, does not necessarily make the claim patentable. See *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (see MPEP § 2112). Furthermore, the Courts have held that apparatus claims must be structurally distinguishable from the prior art in terms of structure, not function. See *In re Danley*, 120 USPQ 528, 531 (CCPA 1959); & *Hewlett-Packard Co. V. Bausch and Lomb, Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (see MPEP § 2114). Regarding claim 7, the chemically-sensitive layer is a mono-layer (2) (see figures 1a & 1b). Regarding claims 8 and 9, Lowell, Jr. *et al.* teach the incorporation of a Wheatstone bridge circuit (see col. 5, lines 45 – 56; figure 7).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowell, Jr. *et al.* in view of Lai *et al.* (U.S. Pat. No. 6,623,620 B2). Lowell, Jr. *et al.* do not specifically teach the incorporation of a chemical sensitive layer comprising gold, which is utilized to detect mercury. Lowell, Jr. *et al.* do teach that the disclosed chemical sensors are used to detect toxic metals (see col. 1, lines 10 – 50). Mercury is notoriously well known in the art to be a toxic metal (see MPEP § 2144.03). Lai *et al.* do teach the use of a gold-coated piezoelectric crystal in detecting mercury vapor (see col. 4, lines 9 – 30). Consequently, a person of ordinary skill in the art would have recognized the suitability of incorporating the teachings of Lai *et al.* with the sensing apparatus, as taught by Lowell, Jr. *et al.*, for the intended purpose of facilitating the effective detection of mercury (see MPEP § 2144.07). Furthermore, the Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). Accordingly, in view of the teachings of Lai *et al.*, a person of ordinary skill in the art would have had a reasonable expectation of success of incorporating the use of gold in a sensing layer in a piezoelectric apparatus to facilitate mercury detection. Therefore, it would have been obvious to a person of ordinary skill in the art to

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incorporate a chemical sensitive layer comprising gold, as taught by Lai *et al.*, with the sensing apparatus, as taught by Lowell, Jr. *et al.*, in order to effectively detect mercury. Regarding the recitation that the target matter comprises mercury, it should be noted that the instant claim is directed to an apparatus statutory class of invention. Therefore, it is the structural limitations of the apparatus, as recited in the claims, which are considered in determining the patentability of the apparatus. This claim recites a process or use limitation and is accorded no patentable weight to an apparatus. This recitation does not impart any limitations to define the structure of the apparatus being claimed. Process or use limitations do not add patentability to a structure, which is not distinguished from the prior art. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967); and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The Courts have held that it is well settled that the recitation of a new intended use, for an old product, does not make a claim to that old product patentable. See *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowell, Jr. *et al.* in view of Pelrine *et al.* (U.S. Pat. No. 6,545,384 B1). Lowell, Jr. *et al.* do not specifically teach the use of chemical sensitive layer comprising a photoresist material. Pelrine *et al.* do teach the use of photoresist materials in fabricating sensor devices containing electroactive polymers (see col. 2, lines 15 – 24 & col. 37, lines 24 – 52). Consequently, a person of ordinary skill in the art would have recognized the suitability of incorporating the teachings of Pelrine *et*

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*al.* with regards to using a photoresist material for the intended purpose of manufacturing an electroactive polymer-based sensor apparatus, as taught by Lowell, Jr. *et al.* (see MPEP § 2144.07). Furthermore, the Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). In view of the teachings of Pelrine *et al.*, a person of ordinary skill in the art would accordingly have had a reasonable expectation of success of incorporating the use of photoresist materials in a sensing layer in a piezoelectric apparatus to facilitate efficient apparatus fabrication.

Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate a chemical sensitive layer comprising a photoresist material, as taught by Pelrine *et al.*, with the sensing apparatus, as taught by Lowell, Jr. *et al.*, in order to provide for an effective way of manufacturing the apparatus. Regarding the recitation that the target matter comprises a volatile organic compound, it should be noted that the instant claim is directed to an apparatus statutory class of invention. Therefore, it is the structural limitations of the apparatus, as recited in the claims, which are considered in determining the patentability of the apparatus. This claim recites a process or use limitation and is accorded no patentable weight to an apparatus. This recitation does not impart any limitations to define the structure of the apparatus being claimed. Process or use limitations do not add patentability to a structure, which is not distinguished from the prior art. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967); and *In re*

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*Otto*, 136 USPQ 458, 459 (CCPA 1963). The Courts have held that it is well settled that the recitation of a new intended use, for an old product, does not make a claim to that old product patentable. See *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

### ***Allowable Subject Matter***

Claims 10 and 27 – 36 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The cited prior art neither teach or fairly suggest that the electrical circuit further comprises a digital signal processor operable to dynamically vary the electrical resistance of the variable resistor to match the resistance of the piezoresistive material.

The cited prior art neither teach or fairly suggest a method of making a sensor that involves the step of coupling a chemical sensitive layer to a piezoresistive material, wherein the chemical sensitive layer is configured such that the reaction of the target matter with the chemical sensitive layer creates an interfacial tension at the interface of the chemical sensitive layer and the piezoresistive material that changes the electrical resistance of the piezoresistive material, but such that the reaction of the target matter with the chemical sensitive layer does not affect the bulk properties of the chemical sensitive layer enough to change the electrical resistance of the piezoresistive material.

### ***Conclusion***


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Josse *et al.* teach a piezoelectric chemical sensing apparatus.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines, Ph.D. whose telephone number is (703) 305-0401. The examiner can normally be reached on Monday - Friday (11:30 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Jill Warden  
Supervisory Patent Examiner  
Technology Center 1700